REMARKS

The present Amendment amends claims 1, 4-7, 9, 10, 13, 14, 18 and 19, leaves claim 20 unchanged and cancels claims 2, 3, 8, 11, 12 and 15-17. Therefore, the present application has pending claims 1, 4-7, 9, 10, 13, 14 and 18-20.

Claims 9, 13 and 18 stand rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regards as their invention. Various amendments were made throughout claims 9, 13 and 18 to bring them into conformity with the requirements of 35 USC §112, second paragraph. Therefore, Applicants submit that this rejection is overcome and should be withdrawn.

Specifically, amendments were made to claims 9, 13 and 18 to overcome the objections noted by the Examiner in paragraph 2 of the Office Action.

Claims 1-3, 5, 7, 8, 10-12, 14-17, 19 and 20 stand rejected under 35 USC §102(b) as being anticipated Yatziv (U.S. Patent Application Publication No. 2002/0062387); claim 4 stands rejected under 35 USC §103(a) as being unpatentable over Yatziv in view of Braddy (U.S. Patent No. 6,141,759); claim 6 stands rejected under 35 USC §103(a) as being unpatentable over Yatziv in view of Konno (U.S. Patent No. 5,835,703); and claims 9, 13 and 18 stand rejected under 35 USC §103(a) as being unpatentable over Yatziv in view of Konno. As indicated above, claims 2, 3, 8, 11, 12, 16 and 17 were canceled. Therefore, these rejections with respect to claims 2, 3, 8, 11, 12, 16 and 17 is rendered moot.

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It should be noted that the cancellation of claims 2, 3, 8, 11, 12, 16 and 17 was not intended nor should it be considered as an agreement on Applicants part that the features recited in claims 2, 3, 8, 11, 12, 16 and 17 are taught or suggested by any of the references of record. The cancellation of claims 2, 3, 8, 11, 12, 16 and 17 was simply intended to expedite prosecution of the present application.

The above noted rejections with respect to the remaining claims 1, 4-7, 9, 10, 13, 14 and 18-20 are traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1, 4-7, 9, 10, 13, 14 and 18-20 are not taught or suggested by Yatziv, Braddy and Konno whether taken individually or in combination with each other as suggested by the Examiner. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw these rejections.

Amendments were made to each of the independent claims so as to more clearly describe features of the present invention. Particularly, amendments were made to each of the independent claims to more clearly recite that the present invention is directed to a magnetic disk array device and a processing off-load function module for use in an interface card existing on a path between at least one ATA magnetic disk and a disk array controller that controls the ATA magnetic disk.

According to the present invention as now more clearly recited in the claims the magnetic disk array device includes at least one ATA magnetic disk, at least one disk array controller for controlling the ATA magnetic disk and at least one interface card having the processing off-load function module

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existing in a path between the disk array controller and the ATA magnetic disk.

Further, according to the present invention the disk array controller outputs to the interface card one of a standard processing fibre channel (FC) command for performing a standard processing and an off-load processing FC command for performing a vendor unique off-load processing.

In the present invention the processing off-load function module includes a command analysis processing section, an operation processing section, a data buffer, an ATA connection interface, an ATA command mapping table and disk ID information management table which records relationship between FC identifiers (IDs) and a ATA connection interface numbers for managing correlation between the FC space IDs and the corresponding ATA magnetic disk and thus realizing indirect allocation of the FC IDs. When the processing off-load function module receives the standard processing FC command sent from the disk array controller, the command analysis processing section determines whether the standard processing FC command can be mapped onto an ATA command and if the standard processing FC command can be mapped, the command analysis processing section uses the ATA command mapping table to select the ATA command that corresponds to the standard processing FC command, prepares in the data buffer the ATA command selected thereby, the ATA connection interface number that can be obtained through correlation with the FC ID from the disk ID information management table and if necessary a stored number for storing data that is obtained by executing the ATA command and issues the

ATA command to the ATA magnetic disk via the ATA connection interface with the ATA connection interface number designated in the data buffer.

Still further, according to the present invention when the processing offload function module receives the offload processing FC command sent from the disk array controller, the operation processing section takes over the offload processing FC command from the command analysis section and prepares a group of ATA commands for the offload processing FC command which achieve an optimal offload processing in an ATA protocol and computes when necessary.

Thus, as is quite clear from the above, the claims have amended to emphasize features relating to the ATA command mapping table and the group of ATA commands.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention now more clearly recited in the claims are not taught or suggested by Yatziv, Braddy or Konno whether taken individually or in combination with each other as suggested by the Examiner.

Yatziv teaches an interface adapter that allows a host device that communicates using a first interface protocol to connect to a plurality of storage devices that communicate through a second interface protocol. Yatziv teaches that the interface adapter is configured so as to convert transmissions receives from the host device from the first interface protocol to

the second interface protocol and convey the converted transmissions to the storage devices.

Particularly, Yatziv discloses that "Interface adapter 120 is configured to receive FC communications from array controller 110, convert them into IDE/ATA-compliant communications, and transmit those communications to one or more of storage devices 130a-130d." in paragraph [0023], page 2 thereof. Further, Yatziv discloses that the "Interface adapter 120 can be configured to read these register outputs from the one of storage devices 130a-130d and can convert the register outputs into a plurality of frames that can be conveyed to host device 100 and/or array controller 110" in paragraph [0025], page 2 thereof.

However, the above noted passages of Yatziv do not teach or suggest any of the command analysis processing section, the operation processing section, the data buffer, the ATA connection interface, the ATA command mapping table and the disk ID information management table as now more clearly recited in the claims.

Thus, Yatziv fails to teach or suggest that the processing offload function module includes a command analysis processing section, an operation processing section, a data buffer, an ATA connection interface, an ATA command mapping table and a disk ID information management table which records relationships between FC IDs and ATA connection interface numbers for managing correlation between the FC IDs and the corresponding ATA magnetic disk and thus realizing indirect allocation of the FC IDs as recited in the claims.

Further, Yatziv fails to teach or suggest that when the processing offload function module receives the standard processing FC command sent from the disk array controller, the command analysis processing section determines whether the standard processing FC command can be mapped onto an ATA command and if standard processing FC command can be mapped, the command analysis processing section uses the ATA command mapping table to select the ATA command that corresponds to the standard processing FC command, prepares in the data buffer the ATA command selected thereby, the ATA connection interface number that can be obtained through correlations with the FC ID from the disk ID information management table and if necessary a storage number for storing data that is obtained by executing the ATA command, and issues the ATA command to the ATA magnetic disk via the ATA connection interface with the ATA connection interface number designated in the data buffer as recited in the claims.

Still further, Yatziv fails to teach or suggest that when the processing offload function module receives the offload processing FC command sent from the disk array controller, the operation processing section takes over the offload processing FC command from the command analysis processing section and prepares a group of ATA commands for the offload processing FC command which achieves an optimal offload processing in an ATA protocol and computes when necessary as recited in the claims.

Therefore, Yatziv fails to teach or suggest the features of the present invention as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 USC §102(b) rejection of claims 2, 3,

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8, 11, 12, 16, 17, 19 and 20 as being anticipated by Yatziv is respectfully requested.

The above described deficiencies of Yatziv are not supplied by any of the other references of record. Particularly, the above described deficiencies of Yatziv are not taught or suggested by Braddy or Konno. Therefore, combining the teachings of Yatziv with one or more of Braddy and Konno still fails to teach or suggest the features of the present invention as now more clearly recited in the claims.

Braddy is merely relied upon by the Examiner for an alleged teaching of a system wherein a controller determines whether the second system can handle a request. Konno is merely relied upon by the Examiner for an alleged teaching of a system wherein a plurality of magnetic disks can be accessed simultaneously through their respective addresses. However, it is quite clear that neither of Braddy or Konno supplies the above described deficiencies of Yatziv relative to the features of the present invention as now more clearly recited in the claims. Particularly, both Braddy and Yatziv do not teach or suggest the above described features of the present invention now more clearly recited in the claims regarding the command analysis processing section, the operation processing section, the data buffer, the ATA connection interface, the ATA command mapping table and the disk ID information table. Thus, both Braddy and Konno suffer from the same deficiencies as Yatziv relative to the features of the present invention as now more clearly recited in the claims.

Therefore, Yatziv taken in combination with one or more of Braddy and Konno fails to teach or suggest the features of the present invention as now

more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 USC §103(a) rejection of claim 4 as being unpatentable over Yatziv in view of Braddy and the 35 USC §103(a) rejection of claim 6, 9 and 18 as being unpatentable over Yatziv in view of Konno is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the references utilized in the rejection of claims 1-20.

In view of the foregoing amendments and remarks, applicants submit that claims 1, 4-7, 9, 10, 13, 14 and 18-20 are in condition for allowance. Accordingly, early allowance of claims 1, 4-7, 9, 10, 13, 14 and 18-20 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (TMI-5150).

Respectfully submitted,

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